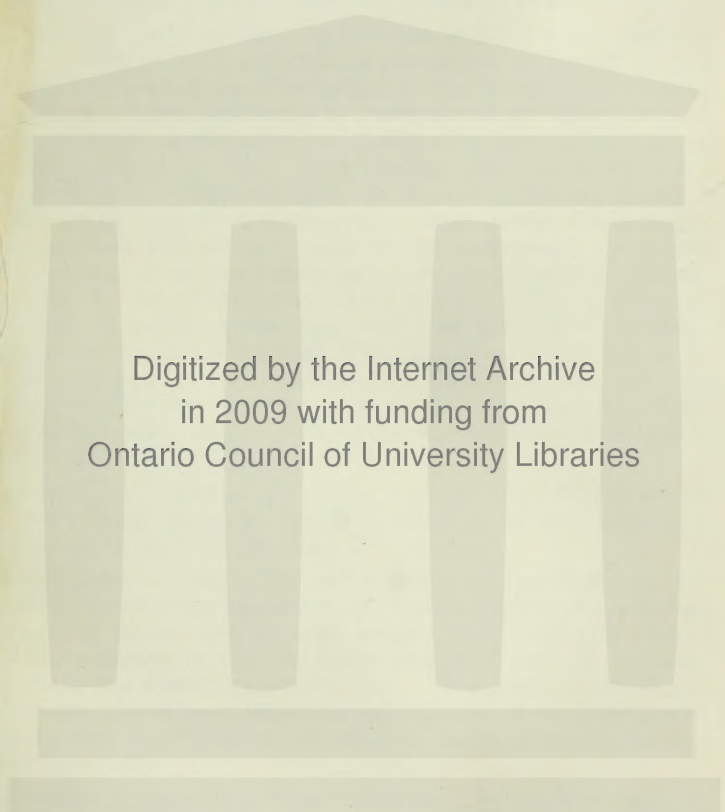


British Association for the Advance-  
ment of Science. Committee on  
Seismological Investigations  
Monthly bulletin  
1915, Sept./Dec.





Digitized by the Internet Archive  
in 2009 with funding from  
Ontario Council of University Libraries





# British Association for the Advancement of Science.—Seismological Committee.

Observations and formal business to  
J. H. BURGESS,  
Earthquake Observatory,  
SHIDE, Isle of Wight.

Special inquiries to  
Prof. H. H. TURNER,  
University Observatory,  
OXFORD.

## Bulletin for Sept., Oct., Nov., and Dec., 1915.

For the large Earthquakes an attempt is here made to compare the readings with theoretical values, as explained in the Nineteenth Report of the Committee to the British Association. The position of the epicentre is determined at Shide, unless otherwise stated; and the tables of times for P and S are those given by Galitzin in his "Vorlesungen über Seismometrie," p. 137, or by G. W. Walker on p. 54 of his "Modern Seismology." It is shown in the above Report that these tables are sensibly erroneous: but the precise values of the corrections are under discussion, and it seems better to await the definitive corrections than to introduce provisional tables. The tables are reproduced in an expanded form on page 2 of this Bulletin. The time of the earthquake at the epicentre is deduced from the best records; and applying the tabular times for the distances in the third column (calculated and also measured from a large globe specially made for the purpose), the errors O - C of the observed times are found.

Observers are requested to send a copy of their Registers to Shide *each month*, in order that this collated information may be published as early as possible.

For the large earthquakes the stations are arranged in the order of distance from epicentre, as shown in the 3rd column. The azimuth in the 4th column is also read from the globe; and is the azimuth at the epicentre measured from N. towards E., in which the observing station lies. The Earthquake Chart formerly given has been discontinued in favour of brief notes for the smaller earthquakes, the stations being arranged in the order of longitude.

The letters in the 2nd column stand for: A. = Alfani; Aga. = Agamennone; B. = Bosch; Bif. = Bifilar; B.O. = Bosch-Omori; C. = Cartuja; Ca. = Cancani; C.O. = Cartuja-Omori; G. = Galitzin; L. = Luckmann; M. = Milne; Ma. = Mainka; M.B. = Milne-Burgess; M.Bk. = Milne-Bullock; M.S. = Milne-Shaw; O.A. = Omori-Alfani; O.E. = Omori-Ewing; S. = Stiattesi; V. = Vincentini; W. = Wiechert.

Riverview has two W. and one Ma.; it is not generally specified from which machine the readings were obtained.

DEC 12 1972

UNIVERSITY OF TORONTO

2

TABLE.

531  
B68  
1915  
Sept/Dec.

De- grees.	P sec.	S sec.	S - P sec.	De- grees.	P sec.	S sec.	S - P sec.	De- grees.	P sec.	S sec.	S - P sec.
1	15	28	13	51	553	991	438	101	855	1565	710
2	31	55	24	52	560	1004	444	102	860	1575	715
3	47	83	36	53	566	1016	450	103	865	1584	719
4	62	110	48	54	573	1029	456	104	870	1593	723
5	77	137	60	55	579	1041	462	105	874	1602	728
6	92	164	72	56	586	1054	468	106	879	1612	733
7	106	190	84	57	592	1066	474	107	884	1621	737
8	121	217	96	58	599	1079	480	108	888	1630	742
9	136	243	107	59	605	1091	486	109	893	1639	746
10	150	269	119	60	612	1103	491	110	897	1648	751
11	164	294	130	61	619	1116	497	111	902	1657	755
12	179	319	140	62	625	1128	503	112	907	1666	759
13	193	344	151	63	632	1141	509	113	911	1674	763
14	206	368	162	64	638	1153	515	114	916	1682	766
15	219	392	173	65	645	1165	520	115	920	1690	770
16	232	415	183	66	651	1177	526	116	925	1698	773
17	245	438	193	67	658	1190	532	117	929	1706	777
18	257	460	203	68	664	1202	538	118	934	1714	780
19	269	482	213	69	671	1214	543	119	938	1722	784
20	281	503	222	70	677	1226	549	120	942	1729	787
21	293	524	231	71	683	1238	555	121	947	1737	790
22	305	545	240	72	690	1250	560	122	952	1744	792
23	317	565	248	73	696	1262	566	123	957	1752	795
24	328	584	256	74	702	1274	572	124	961	1759	798
25	338	603	265	75	709	1286	577	125	966	1766	800
26	348	622	274	76	715	1297	582	126	970	1773	803
27	358	641	283	77	721	1309	588	127	974	1780	806
28	368	659	291	78	727	1320	593	128	978	1787	809
29	378	677	299	79	733	1332	599	129	983	1794	811
30	388	694	306	80	739	1343	604	130	988	1801	813
31	398	711	313	81	745	1355	610	131	992	1807	815
32	407	728	321	82	750	1366	616	132	996	1814	818
33	416	744	328	83	756	1377	621	133	1001	1821	820
34	425	760	335	84	762	1388	626	134	1005	1827	822
35	433	775	342	85	768	1399	631	135	1009	1833	824
36	442	790	348	86	773	1410	637	136	1014	1840	826
37	450	804	354	87	779	1421	642	137	1018	1846	828
38	458	818	360	88	785	1432	647	138	1023	1852	829
39	466	832	366	89	790	1443	653	139	1027	1858	831
40	475	847	372	90	796	1454	658	140	1031	1864	833
41	483	861	378	91	801	1464	663	141	1035	1869	834
42	491	875	384	92	807	1475	668	142	1039	1875	836
43	498	888	390	93	812	1485	673	143	1043	1881	838
44	506	902	396	94	818	1496	678	144	1047	1886	839
45	513	915	402	95	823	1506	683	145	1051	1892	841
46	520	928	408	96	829	1516	687	146	1055	1897	842
47	527	941	414	97	834	1526	692	147	1059	1902	843
48	534	954	420	98	840	1536	696	148	1063	1907	844
49	540	966	426	99	845	1546	701	149	1067	1912	845
50	547	979	432	100	851	1556	705	150	1071	1917	846



1915. September 5.

Origin : 9°5N. 128°0E., determined by Shide.

Time at Origin : 12h. 16m. 56s.

Station and Component.	Machine.	Distance from	° Azimuth.	P.	O-C.	PR <sub>1</sub>	S.	O-C.	L.	M.	Remarks.
				H. M. S.	S.	H. M. S.	H. M. S.	S.	H. M. S.	H. M. S.	
Manila	W.	8.6	308	12 19 11	+ 5	—	12 21 24	+35	12 23 21	12 25 17	—
Zi-ka-wei	W.	22.5	345	12 22 8	+ 1	—	12 26 18	+ 7	—	—	—
Batavia	W.	26.3	234	12 17 29	-318	—	—	—	—	12 25 0	—
Irakutsk	G.	46.9	340	12 25 38	- 4	12 27 36	12 32 33	... 3	12 43 0	12 43 26	—
Sydney	M.	48.6	154	12 35 0	? S.	—	12 35 0	+123	—	—	—
Tiflis	G.	78.6	311	12 23 10	+ 3	—	12 38 53	-10	12 55 0	13 7 38	—
Makeyevka	G.	82.9	318	12 29 34	+ 3	—	12 39 37	-15	13 0 0	13 8 17	—
Pulkovo	G.	85.7	330	12 29 49	+ 1	12 33 17	12 40 11	-12	13 0 0	13 1 24	10°0N. 123°0E. ca.
Helwan	M.	90.9	299	12 40 0	? S.	—	12 40 0	-79	—	—	—
Edinburgh	M.	103.1	334	—	...	—	—	...	—	13 24 0	—
Eskdalemuir	G.	103.5	334	—	...	—	—	...	—	? 13 7 0	—
Bidston	M.S.	104.6	332	—	...	—	—	...	13 14 0	13 27 0	—
Paris	G.	104.6	326	—	...	—	—	...	—	—	—
Shide	M.B.	105.5	329	—	...	—	—	...	—	—	—
La Paz	—	162.8	115	12 35 28	- 5	—	—	...	—	? 13 25 15	12h. 38m. 15s. 12h. 42m. 20s.

1915. September 7.

Origin : 14°·5N. 91°·0W., determined by Shide.

Time at Origin : 1h. 20m. 27s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O-C.			PR <sub>1</sub>			S.			O-C.			L.			M.			Remarks.
				H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	
Toronto	E.	30·9	16	1	27	48							1	32	42				1	34	36	1	39	54	
Harvard Univ.	E.	32·8	28	1	27	19				1	27	51	1	33	54	+26			1	34	23	1	33	54	
Berkeley	E.	32·8	28	1	27	21							1	32	41	+66			1	37	1	1	39	42	
La Paz	S.	33·6	20	1	27	27				1	27	58	1	33	0	-7			1	36	6	1	40	30	
Ottawa	E.	33·6	20	1	27	29													1	36	30	1	40	30	
Lick	E.	35·3	315	1	28	0							1	33	47	+20			1	38	15	1	40	27	
Santa Clara	W.	35·7	315	1	28	0													1	39	0	1	42	36	
Berkeley	W.	36·2	316	1	27	57							1	33	47	+7			1	38	17	1	40	43	
La Paz	W.	38·3	143	1	27	59				1	29	34	1	33	56	-13			1	38	0	1	41	25	
Victoria	M.	43·1	329	1	29	12							1	35	42	+26			1	38	42	1	49	12	
Azores	E.	61·8	55	1	30	42																1	49	54	
Honolulu	M.	63·6	287	1	31	36							1	40	30	+55			1	50	48	1	54	6	
Rio Tinto	E.	76·9	54	1	33	30																2	10	30	
Eskdalemuir	E.	76·9	36	1	32	35				1	35	56	1	42	7	-8						1	58	0	13°·0N. 84°·0W.
Edinburgh	M.	76·9	35	1	33	0																2	8	54	
San Fernando	E.	77·3	55	1	33	0							1	42	0	-19			1	53	0	2	9	0	
Bidston	E.	77·3	39	1	33	6							1	43	0	+41			1	57	18	2	8	0	
West Bromwich	M.S.	77·3	39	1	31	48				1	37	48	1	42	30	+11						2	9	42	
Shide	M.	78·0	39	1	32	50							1	42	40	+13									
Newport, I.W.	M.S.	78·7	40	1	32	38							1	42	38	+3						2	3	0	
Haslemere	E.	78·7	40	1	32	46							1	43	36	+3			1	57	16	2	3	0	
Guildford	M.Bk.	78·7	40	1	32	46							1	43	36	+1						2	2	46	
Kew	M.	79·0	40	1	33	0							1	45	0	+141						2	5	0	
Ascension	E.	79·1	40	1	31	46							1	42	0	-40			1	53	45	2	12	27	
Granada	M.	79·2	38	1	33	0																2	9	0	
Paris	M.	79·2	101	1	34	0							1	42	0	...						1	44	30	
Barcelona	C.	79·3	54	1	32	48							1	42	45	+3						1	58	18	A Destructive in San Salvador.
Paris		81·5	42	1	32	58																2	0	0	
Barcelona	Ma.	82·8	49	1	33	1							1	43	16	-6						1	54	57	







Makeyevka	G.	71.4	42	20	55	22	+	3	21	4	53	+	5	21	29	0	21	26	13	—
Victoria	M.	81.3	518	21	12	54	?	8.	—	—	—	—	—	—	—	—	—	—	—	—
Simla	O.E.	109.4	54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Irkutsk	G.	111.5	24	21	2	53	+	259	21	9	59	—	—	—	—	—	—	—	—	—
Kodaikanal	M.	112.8	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Batavia	W.	144.3	88	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

i 21h. 40m. 0s.  
17.58. 129.06.  
e 21h. 4m. 0s.

### Small Earthquakes which do not give good determinations

*September 1, 1hr.:* Eskdalemuir, Bidston, Shide, Paris, Moncalieri, Rocca di Papa, Cape Town, Pulkovo, Helwan, Tiflis, Bombay, Simla, Kodaikanal, Colombo, Irkutsk, Batavia, Manila, Zi-ka-wei, Riverview, La Paz.

*September 3, 2hrs.:* Shide, Moncalieri, Rocca di Papa, Pompeii, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk.

*September 3, 11hrs.:* Eskdalemuir, Bidston, Guildford, Paris, Moncalieri, Pulkovo, Makeyevka, Tiflis, Irkutsk, Manila, Zi-ka-wei, Osaka.

*September 3, 22hrs.:* Eskdalemuir, Paris, Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk, Batavia, Manila, Zi-ka-wei, Osaka, Riverview, Fanning Island, Honolulu, La Paz.

*September 6, 17hrs.:* Rio Tinto, San Fernando, Granada, Eskdalemuir, Edinburgh, Bidston, Shide, Guildford, Kew, Paris, Moncalieri, Rocca di Papa, Padova, Cape Town, Pulkovo, Helwan, Makeyevka, Tiflis, Mauritius, Kodaikanal, Irkutsk, Batavia, Perth, Manila, Zi-ka-wei, Adelaide, Sydney, Riverview, Honolulu, Victoria, Berkeley, Toronto, Ottawa, Harvard University, La Paz.

*September 7, 4hrs.:* Victoria, Toronto, Ottawa, Harvard University, La Paz.

*September 7, 5hrs.:* Victoria, Toronto, Ottawa, Harvard University, La Paz.

*September 7, 13hrs.:* San Fernando, Granada, Eskdalemuir, Edinburgh, Guildford, Kew, Paris, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk, Victoria, Berkeley, Toronto, Ottawa, La Paz.

*September 7, 20hrs.:* San Fernando, Eskdalemuir, Edinburgh, Guildford, Kew, Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk, Victoria, Toronto, Ottawa, Harvard University, La Paz.

*September 8, 12hrs.:* Edinburgh, Rocca di Papa, Helwan, Osaka, Lick, Toronto, Ottawa, La Paz.

*September 10, 22hrs.:* Eskdalemuir, Moncalieri, Helwan, Tiflis, Fanning Island, La Paz.

*September 12, 0hrs.:* Granada, Eskdalemuir, Edinburgh, Bidston, Shide, Kew, Paris, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Bombay, Simla, Kodaikanal, Irkutsk, Batavia, Manila, Zi-ka-wei, Osaka, Riverview, Honolulu, La Paz.



1915. September 23.

Origin : 16°0N. 38°·5E., determined by Slide.

Time at Origin : 8h. 14m. 43s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O-C.		PR <sub>1</sub>			N.			O-C.		L.			M.		Remarks.	
				H.	M.	S.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.		S.
Helwan	E.	15·2	335	8	18	48	+23	—	—	—	8	22	36	+76	—	—	8	29	0	8	49	36	? 3140 km.s.
Tifis	G.	26·2	11	8	20	30	-3	—	—	—	8	25	23	+14	—	—	8	32	9	8	32	9	
Malto	E.	29·1	317	8	8	26	0	? S.	—	—	8	26	0	-2	—	—	8	36	30	8	36	30	
Pompeii	S.	32·2	325	8	21	0	-32	—	—	—	8	29	30	+156	—	—	8	29	0	—	—	—	
	O.A.	32·3	325	8	21	0	-32	—	—	—	8	29	0	+126	—	—	8	29	0	—	—	—	
Bombay	E.	32·8	80	8	24	23	+166	—	—	—	8	27	0	-4	—	—	8	38	36	8	27	0	? S.
Rocca di Papa	E.	34·0	325	8	21	39	-9	—	—	—	8	29	0	...	—	—	8	38	18	8	39	18	—
Rodafanal	Ag.	38·3	92	8	29	0	? S.	—	—	—	8	28	18	-7	—	—	8	38	8	8	44	4	
Simla	M.	38·3	60	8	22	0	-23	—	—	—	8	28	32	0	—	—	8	38	1	8	44	2	
Moncalieri	S.	38·8	325	8	22	24	-3	—	—	—	8	28	54	0	—	—	8	38	1	8	43	42	—
Barcelona	M.	40·3	317	8	22	28	-12	—	—	—	8	43	0	+830	—	—	8	39	24	8	43	42	
Columbo	M.	41·4	98	8	22	54	...	—	—	—	8	29	34	+7	—	—	8	45	25	8	45	25	
Granada	C.	42·7	308	8	22	54	-5	—	—	—	8	29	42	-2	—	—	8	46	0	8	48	0	15°7N. 34°8E.
Paris	—	43·9	326	8	23	1	-7	—	—	—	8	29	43	...	—	—	8	36	0	8	36	12	
	—	44·1	354	8	23	11	+3	—	—	—	8	29	20	-26	—	—	8	37	0	8	42	41	
Pulkovo	G.	44·1	17	8	23	6	-4	—	—	—	8	37	30	+458	—	—	8	40	30	8	44	30	—
Ekaterinburg	E.	44·5	306	8	26	0	+167	—	—	—	8	37	0	+428	—	—	8	45	0	8	45	0	
San Fernando	S.	44·5	306	8	25	0	+107	—	—	—	8	30	30	+31	—	—	8	49	0	8	49	0	
Rio Tinto	E.	45·1	308	8	30	30	? S.	—	—	—	8	28	42	-101	—	—	8	51	0	—	—	—	Beyond the edge of the paper.
Kew	E.	46·9	328	8	28	42	? S.	—	—	—	8	30	25	+1	—	—	8	49	0	—	—	—	
Shide	E.	46·9	326	8	23	30 <sup>4</sup>	0	—	—	—	8	30	30	+6	—	—	8	49	0	—	—	—	
	E.	47·0	326	8	23	30	0	—	—	—	8	30	30	...	—	—	8	49	0	—	—	—	
	E.	47·0	326	8	23	30	...	—	—	—	8	30	30	...	—	—	8	49	0	—	—	—	
Stonyhurst	E.	47·0	326	8	30	27	+3	—	—	—	8	30	27	+3	—	—	8	49	22	8	49	22	—
Bidston	E.	49·3	329	8	32	0	? S.	—	—	—	8	32	0	+67	—	—	8	47	0	8	47	0	
Esdaemuir	S.	49·1	329	8	31	0	166	—	—	—	8	31	0	+6	—	—	8	59	42	8	59	42	
Edinburgh	G.	50·5	331	8	31	16	+8	—	—	—	8	31	16	+8	—	—	8	49	0	8	49	0	—
	E.	50·8	331	8	31	0	? S.	—	—	—	8	31	0	-12	—	—	8	49	0	8	49	0	
	E.	50·8	331	8	31	0	? S.	—	—	—	8	31	0	-12	—	—	8	49	0	8	49	0	

Cape Town	E.	M.	53.5	201	8	36	18	+725	—	—	8	42	30	+656	—	—	8	43	48	1	
Azores		M.	60.0	305	8	25	17	...	8	27	39	8	33	42	...	8	47	0	8	52	6
Irkutsk		G.	62.6	39	8	26	0	...	8	26	0	8	36	24	...	8	47	0	8	54	57
Ishtar		W.	71.1	102	8	26	46	...	8	29	36	8	36	24	...	8	47	0	8	54	57
Zi-ka-wei		W.	75.8	61	8	26	46	...	8	29	36	8	36	24	...	8	47	0	8	54	57
Toronto	E.	M.	97.7	320	8	34	42	...	8	29	36	8	36	24	...	8	47	0	8	54	57
La Paz		M.	109.9	258	8	34	42	+302	—	—	—	—	—	...	9	9	0	9	11	5	0
Victoria	E.	M.	113.3	347	8	34	42	...	—	—	—	—	—	...	9	29	6	9	36	0	—

### Small Earthquakes which do not give good determinations—

*September 15, 22hrs.:* Edinburgh, Pulkovo, Makeyevka, Irkutsk, Honolulu, La Paz.

*September 16, 10hrs.:* Eskdalemuir, Edinburgh, Shide, Paris, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk, Toronto.

*September 17, 4hrs.:* Irkutsk, Batavia, Manila, Zi-ka-wei, Riverview, La Paz.

*September 17, 5hrs.:* Edinburgh, Pulkovo, Helwan, Makeyevka, Victoria, Toronto.

*September 19, 11hrs.:* Shide, Haslemere, Moncalieri, Padova, Rocca di Papa, Pulkovo, Helwan, Tiflis.

*September 19, 12hrs.:* Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Irkutsk.

*September 20, 22-23hrs.:* Bidston, Stonyhurst, Moncalieri, Helwan, Irkutsk, La Paz.

*September 21, 18-19hrs.:* Granada, Eskdalemuir, Edinburgh, Shide, Kew, Paris, Moncalieri, Rocca di Papa, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Manila, La Paz.

*September 22, 15hrs.:* Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Batavia, Zi-ka-wei, La Paz.

*September 25, 20hrs.:* San Fernando, Eskdalemuir, Bidston, Paris, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk.

*September 28, 9hrs.:* Bidston, Shide, Pulkovo, Helwan, Makeyevka, Ekaterinburg, Honolulu, Victoria, Toronto.

*September 28, 22hrs.:* San Fernando, Pulkovo, Helwan, Makeyevka, Ekaterinburg, Simla.

*September 30, 1hrs.:* Edinburgh, Stonyhurst, Pulkovo, Tiflis, Ekaterinburg, Irkutsk.





**Small Earthquakes which do not give good determinations—**

- October 2, 2 hrs.:* Eskdalemuir, Bidston, Pulkovo, Helwan, Ekaterinburg, Irkutsk, Batavia, Manila.  
*October 2, 23 hrs.:* Edinburgh, Stonyhurst, Paris, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Manila, Victoria, Berkeley, Santa Clara, Lick, Toronto, Ottawa, Harvard University.  
*October 3, 0 hrs.:* Eskdalemuir, Edinburgh, Stonyhurst, Paris, Moncalieri, Makeyevka, Tiflis, Manila.  
*October 5, 13-14 hrs.:* San Fernando, Granada, Eskdalemuir, Edinburgh, Bidston, Shide, Kew, Paris, Moncalieri, Rocca di Papa, Pompeii, Cape Town, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Shukla, Kodakanal, Colombo, Irkutsk, Batavia, Perth, Manila, Zi-ka-wei, Osaka, Adelaide, Sydney, Riverview, Honolulu, Victoria, Berkeley, Toronto, La Paz.  
*October 8, 0 hrs.:* San Fernando, Pulkovo, Helwan, Tiflis, La Paz.  
*October 8, 5 hrs.:* Tiflis, Mauritius, Ekaterinburg, Irkutsk, Berkeley, Santa Clara, Lick.  
*October 9, 4 hrs.:* Granada, Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Kew, Paris, Pulkovo, Tiflis, Manila, Zi-ka-wei, La Paz.  
*October 10, 5-6 hrs.:* Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Manila, Sydney, Riverview, Honolulu, Victoria, Toronto.  
*October 10, 9-10 hrs.:* Eskdalemuir, Edinburgh, Bidston, Shide, Moncalieri, Pulkovo, Helwan, Ekaterinburg, Irkutsk, Honolulu, Victoria, Toronto, La Paz.  
*October 11, 16-17 hrs.:* Eskdalemuir, Edinburgh, Bidston, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Osaka, Honolulu.  
*October 12, 2 hrs.:* Edinburgh, Bidston, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Berkeley, La Paz.  
*October 12, 6-7 hrs.:* Shide, Helwan, Ekaterinburg, Bombay, Irkutsk, Batavia, Riverview.  
*October 13, 1-2 hrs.:* Edinburgh, Pulkovo, Helwan, Ekaterinburg, Irkutsk, Manila, Sydney, Riverview.  
*October 13, 6 hrs.:* Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, La Paz.  
*October 13, 11 hrs.:* Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei.  
*October 13, 12 hrs.:* Shide, Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.  
*October 13, 19 hrs.:* Stonyhurst, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.  
*October 14, 16 hrs.:* Edinburgh, Bidston, Stonyhurst, Shide, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka, La Paz.  
*October 14, 18-19 hrs.:* San Fernando, Granada, Edinburgh, Bidston, Stonyhurst, Shide, Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka, La Paz.

1915. October 3.

Origin: 36° 5' N. 118° 0' W., determined by Shide.

Time at Origin : 6h. 52m. 49s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.	O-C.	Pr <sub>1</sub>	S.	O-C.	L.	M.	Remarks.
				H. M. S.		H. M. S.	H. M. S.		H. M. S.	H. M. S.	
Lick	W.	3.0	287	6 54 27	+51	—	6 55 17	+65	6 55 36	6 55 42	—
Sancti Clara	W.	3.3	286	6 54 25	+44	—	—	—	6 54 40	6 55 30	—
Berkeley	—	3.7	291	6 54 31	+44	—	6 55 34	+63	6 55 51	6 56 8	—
Victoria	M.	12.5	313	6 54 54	-61	—	—	—	6 57 12	7 0 48	—
Toronto	M.	30.1	64	6 59 36	+18	—	7 4 30	+5	7 7 12	7 10 30	—
Ottawa	E.	32.7	61	6 59 34	-8	—	7 4 40	-28	7 9 18	7 12 42	—
Harvard Univ.	E.	32.7	61	6 59 35	7	—	7 4 40	-28	7 9 18	7 11 36	—
Honolulu	E.	36.2	66	7 0 6	-7	—	7 5 40	-22	7 10 36	7 12 11	—
La Paz	E.	37.9	258	7 1 39	+64	—	—	—	7 10 12	7 12 24	—
Edinburgh	—	70.8	129	7 4 51	+40	7 7 40	7 14 19	+51	7 28 0	7 33 36	Felt in Nevada.
Edinburgh	—	72.3	32	7 4 0	-21	—	—	—	—	7 33 0	—
Edinburgh	M.S.	72.7	33	7 4 25	+2	7 7 4	7 13 45	—	—	7 35 0	—
Boston	M.S.	74.0	34	7 4 36	+5	—	7 14 2	-1	—	7 36 0	—
Stonyhurst	E.	74.0	34	7 3 36	-55	—	7 13 0	-63	7 23 0	7 31 0	—
West Bromwich	E.	75.1	35	7 4 44	+5	—	7 14 7	-9	—	—	—
Shide	M.	76.6	36	7 4 51	+3	—	7 14 34	+1	7 30 39	7 39 51	—
—	M.	76.6	36	7 4 54	+6	—	7 14 30	-3	7 31 19	—	—
—	M.B.	76.6	36	7 4 54	+3	—	7 14 29	-4	7 30 19	7 40 19	—
Haslemere	E.	76.6	35	7 4 0	-48	—	7 19 0	+267	—	7 31 24	—
Guildford	M.	76.6	35	7 5 4	+16	—	7 15 42	+69	7 29 0	—	—
Kew	M.	76.6	35	7 5 4	+54	—	—	—	—	7 36 18	—
Paris	E.	79.7	35	7 5 6	0	—	7 15 0	—	7 23 0	7 33 0	—
—	E.	79.7	35	7 5 16	+10	—	7 15 23	+14	—	—	—
Pulkovo	G.	80.2	16	7 5 6	-3	7 8 1	7 15 4	-10	7 28 0	7 39 13	33°2N, 119°8W. S. R. 7h. 20m. 17s.
—	G.	80.2	16	7 5 10	+1	—	—	—	—	—	—
Osaka	G.	81.0	307	7 5 32	+18	—	7 15 32	+8	7 23 18	7 48 32	—
Rio Tinto	E.	82.4	48	7 4 0	-81	—	—	—	—	7 41 0	—
San Fernando	M.	83.4	49	7 5 0	-27	—	7 16 30	+40	7 31 30	7 48 30	—
—	M.	83.4	49	7 5 0	+28	—	7 16 18	+28	7 32 0	7 48 30	—
Irkutsk	G.	83.9	336	7 5 5 29	-1	7 8 30	7 15 42	-14	7 29 0	7 32 55	—

Granada	C.	84.5	47	7	5	35	+	1	—	7	15	52	—11	7	28	48	7	35	50	37°50'N. 114°55'W.
Barcelona	Ma.	84.7	41	7	5	37	+	2	—	7	16	0	—5	7	21	32	7	33	45	—
Moncalieri	S.	84.9	35	7	5	46	+	10	—	7	16	7	0	7	22	8	7	43	45	—
Padova	V.	86.5	35	7	5	48	+	3	—	7	16	14	—11	7	28	14	7	44	40	—
Ekaterinburg	G.	86.6	1	7	5	39	—	7	—	7	16	3	—23	7	26	0	7	50	12	39°5'N. 114°3'W.
Rocca di Papa	Aga.	89.6	34	7	5	43	—20	—	—	7	16	44	—15	7	29	12	7	46	15	—
Zi-ka-wei	W.	92.4	312	7	6	21	+	3	—	7	17	2	—26	7	31	50	7	46	15	—
Makeyevka	O.	92.4	312	7	6	27	+	9	—	7	17	5	—23	7	31	0	7	43	3	—
Malta	G.	92.8	16	7	6	21	+	1	—	7	17	19	—13	7	31	0	7	56	30	—
Tiflis	M.	95.2	37	7	16	0	?	S.	—	7	16	0	—117	7	30	0	7	46	18	Seconds ±
Manila	G.	100.2	13	7	7	19	+	18	—	7	18	19	—28	7	34	10	7	44	10	e 7h. 11m. 37s.
Ascension	W.	104.6	391	—	—	—	...	—	—	7	23	35	+248	7	—	—	7	53	0	—
Helwan	M.	105.7	88	7	7	0	—27	—	—	7	—	—	...	7	39	30	7	49	40	8.R. 7h. 28m. 6s.
Riverview	M.	107.6	28	7	7	0	—35	—	—	7	22	6	+110	7	46	48	7	51	12	—
Sydney	E.	109.9	242	?	11	24	+218	—	—	7	22	12	+115	7	47	30	7	50	30	—
Simla	M.	110.0	242	7	12	12	?	S.	—	7	—	—	...	7	—	—	8	4	24	—
Adelaide	O.E.	110.9	346	7	12	0	+249	—	—	7	22	42	+72	7	—	—	8	4	27	—
Bombay	M.	118.9	246	7	22	42	?	S.	—	7	—	—	...	7	—	—	8	13	0	e 7h. 13m. 0s.
Batavia	M.	123.7	348	7	15	27	+398	—	—	7	—	—	...	7	40	0	8	15	48	—
Kodikanal	W.	129.2	295	—	—	—	...	—	—	7	24	0	+63	7	—	—	8	17	48	—
Colombo	M.	131.1	340	7	24	0	?	S.	—	7	—	—	...	7	—	—	8	13	12	—
Perth	M.	133.5	325	7	15	48	+376	—	—	7	—	—	...	7	—	—	8	13	12	—
Cape Town	E.	135.8	239	7	17	0	+438	—	—	8	6	48	? L.	7	—	—	8	13	12	—
Mauritius	M.	144.6	99	7	12	48	+150	—	—	7	—	—	...	7	36	42	—	—	—	—
	E.	162.2	13	7	36	42	?	L.	—	—	—	—	...	—	—	—	—	—	—	—



1915. October 8.

Origin : 36°0N. 138°0E., determined by Slide.

Time at Origin : 15h. 35m. 52s.

Station and Component.	Machine.	Distance ° from Origin.	Azimuth.	P.			O-C.			PR <sub>1</sub>			S.			O-C.			L.			M.			Remarks.	
				H.	M.	S.	S.		H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.			
Osaka	O.	25.5	239	15	37	6	+35																			
Zi-ka-wei	W.	14.6	256	15	39	22	4										15	41	38	15	37	51	15	38	32	360 kms.
Manila	O.	14.6	256	15	39	26	0										15	42	7	15	46	7	15	45	7	
Irkutsk	W.	26.3	220	15	41	0	43										15	45	31	15	48	31	15	45	31	
Simla	G.	28.7	315	15	41	52	-15										15	45	54	15	48	36	15	48	36	
Batavia	O.E.	50.1	283	15	41	52											15	16	36	15	54	30	15	56	11	37.1s. 138.0E. i 15h. 47m. 0s.
Elaaterinburg	W.	51.4	221	15	44	32	36										15	51	12	16	3	0	15	52	0	
Honolulu	G.	53.9	319	15	45	19	5										15	52	49	16	3	0	16	12	38	
Fukovo	M.	57.0	86	15	51	12	5										15	54	12	15	59	12	15	59	42	
Tiflis	G.	67.4	329	15	46	49	3										15	55	37	16	10	0	16	15	8	38.20s. 141.0E. ? 16h. 30m. 0s.
Makeyevka	G.	69.0	307	15	47	5	3										15	56	6	16	16	0	16	16	0	
Edinburgh	M.	82.3	339	15	58	0	8										15	58	0	15	59	0	15	59	0	
Esikalemuir	G.	82.8	339	15	58	0	8										15	58	25	16	4	9	16	20	0	
Bidston	M.S.	84.4	338	15	57	42	2										15	57	42	16	4	9	16	30	24	
Helwan	E.	84.7	314	15	49	0	+22										15	58	26	16	16	0	16	30	24	
Padova	V.	85.1	325	15	51	6	+115										15	58	0	16	16	0	16	30	24	
Kew	M.	85.2	335	15	58	0	8										15	58	26	16	16	0	16	30	24	
Guldford	M.	85.4	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
Shide	M.	86.2	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
	M.	86.2	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
	M.	86.2	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
	M.S.	86.2	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
	M.B.	86.2	335	15	48	2	-40										15	58	0	16	16	0	16	30	24	
	M.	86.4	332	15	48	2	-40										15	58	0	16	16	0	16	30	24	
Paris		86.4	332	15	48	2	-40										15	58	0	16	16	0	16	30	24	
Rocca di Papa	Ag.	87.5	322	15	48	48	6										15	58	0	16	16	0	16	30	24	
Granada	C.	88.5	380														15	58	0	16	16	0	16	30	24	
La Paz		149.7	57	15	55	33	+111										15	58	0	16	16	0	16	30	24	

1915. October 11.

Origin : 8°N. 39°W., determined by Slide.

Time at Origin : 2h. 37m. 44s.

Station and Component.	Machine.	Distance ° from Origin.	Azimuth.	P. H. M. S.	O-C. S.	Pr <sub>1</sub> H. M. S.	S. H. M. S.	O-C. S.	L. H. M. S.	M. H. M. S.	Remarks.
Ascension	M.	29.2	122	2 46 0	+116	—	—	—	—	2 53 0	
Azores	M.	32.1	20	2 51 30	? 8.	—	—	+96	—	3 0 50	
La Paz	M.	37.8	230	2 45 31	+11	2 47 1	2 51 37	+18	2 58 0	3 5 30	—
Sun Fernando	M.	41.2	41	—	—	—	2 51 0	-68	3 2 0	3 5 12	
	M.	41.2	41	—	—	—	2 51 0	-68	3 2 0	3 8 0	
Rio Tinto	M.	41.7	40	2 51 0	? 8.	—	2 52 5	-75	2 57 30	3 2 48	
Granada	C.	43.3	12	2 45 41	-23	—	2 54 36	-51	3 0 50	—	
Ottawa	B.	49.0	326	2 47 11	+27	—	2 54 36	+33	3 5 42	—	
Toronto	M.	50.0	322	—	—	—	2 54 36	-11	2 59 30	3 2 45	
Shide	M.	52.9	29	—	—	—	2 51 27	-12	3 4 20	3 2 27	
	M.	52.9	29	—	—	—	2 54 30	-9	3 4 33	—	
	M.B.	53.6	29	2 37 19	-595	—	2 54 36	-12	3 1 0	3 4 0	
Guildford	M.	53.6	33	—	—	—	2 54 36	-50	3 11 36	—	
Paris	M.	53.8	29	2 54 0	? 8.	—	2 55 0	+8	3 3 1	3 7 24	
Kov	M.	53.8	26	2 55 30	? 8.	—	2 55 30	+32	3 2 6	3 8 0	
Boston	M.	54.1	26	—	—	—	2 54 55	-11	3 0 0	—	
Stonyhurst	E.	55.1	24	2 47 24	+5	—	2 54 45	-23	2 59 54	3 7 42	
Eschalemmir	S.	55.2	39	2 47 29	? 8.	—	2 55 0	-13	3 3 48	—	
Moncalieri	M.	55.6	23	2 55 0	—	—	2 54 44	-41	3 8 18	—	
Edinburgh	E.	56.6	44	2 47 27	-7	—	2 57 36	-22	3 29 30	—	
Rocca di Papa	Aga.	56.6	131	—	—	—	2 58 40	-2	3 10 0	—	
Cape Town	M.	68.6	61	2 57 36	? 8.	—	2 59 4	-17	3 18 0	—	
Helwan	M.	69.0	61	2 49 19	+1	—	2 59 51	-17	3 14 12	3 22 18	
Pulkovo	E.	72.7	30	2 49 33	+2	—	—	—	—	3 16 41	S.R. 3h. 3m. 0s.
Maiteyevka	G.	75.4	42	2 49 33	—	—	—	—	—	—	
Thills	G.	80.1	49	2 49 39	-5	—	—	—	—	—	
Victoria	M.	80.3	318	—	—	—	3 1 13	—	3 14 0	3 22 42	
Ekatrinburg	G.	88.5	33	2 50 46	-6	—	—	—	—	—	
Irkutsk	G.	112.0	23	2 51 8	-103	—	3 0 28	-302	3 27 0	3 52 9	

7.88. 33°Sw. approx.

1915. October 11.

Origin : 18°0N. 69°5W., determined by Slide.

Time at Origin : 19h. 32m. 50s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.		O. C.		PR <sub>1</sub>		Σ.		O. C.		L.		M.		Remarks.
				H.	M.	S.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.	H.	
Harvard Univ.	N.	214	237	19	38	25	1.3			19	12	24	18	19	13	22		
Toronto	E.	270	344	19	40	6	178			19	13	42	11	19	50	30	19	53 48
Ottawa	B.	270	351	19	40	0	163			19	13	36	11	19	46	6	19	46 54
La Paz		345	178	19	40	18	119	19	41	58			6	19	51	10	19	57 0
Azores	M.	430	53	19	43	56	...			19	15	32	8					i 19h. 48m. 18s.
Berkeley		499	305				120			19	17	30	...					
Victoria	M.	529	318				...			19	19	24	113	19	58	6	20	3 50
Rio Tinto	E.	579	56				...			19	58	30	525	20	8	18		
San Fernando	M.	582	58				...			19	51	30	139	20	3	30	20	10 0
Granada	E.	602	58	19	44	0	170			19	51	0	9	20	1	0	20	7 30
Hibdon	C.	616	38	19	43	4	1			19	51	5	9	19	58	30	20	1 48
Edinburgh	M.	618	36	19	43	9	...			19	51	36	13					17°0N. 65°46W.
Edinburgh	E.	620	36	19	51	0	?	5		19	51	26	10					
Stonyhurst	E.	621	38	19	43	30	114			19	51	6	127	20	3	6	20	12 36
Slide	M.	624	42	19	43	28	110			19	51	50	7					20 13 37
	E.	624	42	19	43	25	17			19	51	35	8	20	3	20	13 15	
	M.	624	42	19	43	22	1			19	51	35	8	20	2	0	20	13 7
Guildford	E.	630	41				...			19	51	30	...	19	59	55	20	13 12
Bow	M.	631	41	19	51	30	?	8.		19	51	30	...	20	5	29	20	13 0
Bordeaux	M.	616	52				...						...	20	5	29	20	12 38
Paris	E.	618	44	19	43	33	1			19	51	59	14					a 19h. 50m. 45s.
	E.	618	44	19	43	40	1			19	52	7	6	20	3	0	20	5 0
Montedieri	S.	685	48	19	44	7	1			19	52	55	3	20	6	11	20	9 17
Recan di Piqu	Ag.	724	51	19	44	18	4			19	53	32	13	20	9	0		
Pulkovo	E.	793	39	19	45	5	0			19	54	55	10	20	8	0	20	30 6
Honolulu	M.	892	290				...						...	20	11	36	20	21 42
Makarevka	E.	878	40	19	45	49	...			19	56	11	29	20	13	0	20	19 7
Helwan	E.	901	58	19	56	0	?	8.		19	56	0	65					



Ekaterinburg	G.	94.5	25	19	45	22	-69	—	—	19	56	52	-59	20	13	0	20	24	3	16-88. 72-2w. 12 19h. 58m. 52s.	
Tiflis	G.	95.0	43	19	46	21	-12	19	50	5	19	56	58	-58	20	18	30	20	25	11	
Cape Town	M.	98.3	57				...						...	20	40	36	20	40	36		
Irkutsk	G.	109.5	4	19	45	59	-106	19	52	10	19	55	22	292	20	20	0	20	25	7	
Simla	O.E.	121.4	33				...						...	20	37	24	20	37	24		
Zi-ka-wei	W.	129.7	318				...						...	20	26	41	20	26	41		
Kodakamal	M.	136.9	52				...						...	20	52	48	20	52	48		

1915. October 12.

Origin : 38°0'N. 145°0'E., determined by Shide.

Time at Origin : 21h. 28m. 51s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O-C.		PR <sub>1</sub>			S.			O-C.		L.			M.		Remarks.
				Il.	M.	S.	S.		Il.	M.	S.	Il.	M.	S.	Il.	M.	S.	Il.	M.	S.		
Oesaka	O.	8.4	250	21	31	4	+ 6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	870 kms.
Zi-ka-wei	W.	20.5	258	21	33	36	- 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Irkutsk	O.	20.5	258	21	35	38	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Honolulu	G.	31.5	310	21	30	13	-321	—	—	—	—	—	—	—	—	—	—	—	—	—	—	41°18. 144°2'E.
Simla	M.	51.4	93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	O.E.	55.1	285	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Ekaterinburg	G.	56.1	319	21	38	39	+ 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Victoria	M.	63.6	48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Colombo	E.	66.4	260	22	14	0	+2055	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Pulkovo	M.	68.6	331	21	39	59	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Tiflis	G.	72.2	309	21	40	22	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Makeyevka	G.	72.4	318	21	40	24	+ 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Edinburgh	G.	82.3	343	21	51	0	? 8.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Eskelelmuir	M.	82.8	342	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Bidston	G.	82.8	341	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Stonyhurst	M.S.	84.0	341	21	42	30?	+57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Kew	E.	85.5	339	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Guilford	E.	85.8	339	21	42	37	+51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Haslemere	M.	86.0	339	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Shide	E.	86.5	339	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	M.S.	86.5	339	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	M.B.	86.5	339	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Paris	—	87.1	336	21	41	39	- 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Helwan	E.	88.1	307	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Moncalieri	S.	88.6	331	21	52	0	? 8.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Rocca di Papa	Aga.	89.2	327	21	52	16	? 8.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Harvard Univ.	B.O.	93.2	26	—	—	—	- 6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Barcelona	H.O.	93.6	333	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Granada	Ma.	93.6	333	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	C.	99.5	335	21	42	56	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
San Fernando	M.	100.9	337	—	—	—	- 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	S.	100.9	337	21	46	30	+204	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

**Small Earthquakes which do not give good determinations—**

- October 15, 16-17hrs.:* Edinburgh, Bidston, Stonyhurst, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.
- October 16, 15hrs.:* Shide, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Osaka.
- October 16, 18hrs.:* Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Manila, Zi-ka-wei, Osaka.
- October 17, 23hrs.:* San Fernando, Granada, Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei.
- October 19, 22-23hrs.:* Bidston, Edinburgh, Rocca di Papa, Helwan, Ekaterinburg, Irkutsk, Sydney, Riverview.
- October 23, 2-3hrs.:* Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Paris, Moncalieri, Pulkovo, Makeyevka, Tiflis, Irkutsk, Zi-ka-wei, Osaka.
- October 23, 11-12hrs.:* Edinburgh, Bidston, Shide, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Batavia, Zi-ka-wei, Riverview, Honolulu.
- October 26, 12-13hrs.:* Eskdalemuir, Bidston, Shide, Cape Town, Helwan, Ekaterinburg, Tiflis, Irkutsk, Osaka, La Paz.
- October 26, 22hrs.:* San Fernando, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Simla, Irkutsk.
- October 31, 8-9hrs.:* San Fernando, Granada, Eskdalemuir, Bidston, Stonyhurst, Shide, Kew, Moncalieri, Rocca di Papa, Malta, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Sydney, Riverview, Victoria, La Paz.
- October 31, 15-16hrs.:* Edinburgh, Bidston, Stonyhurst, Shide, Moncalieri, Pulkovo, Helwan, Makeyevka, Ekaterinburg, Sydney, La Paz.
- November 1, 9hrs.:* Granada, Shide, Haslenere, Guildford, Rocca di Papa, Makeyevka, Tiflis, Mauritius, Bombay, Batavia, Manila, Zi-ka-wei, Osaka, Victoria, Toronto, La Paz.
- November 1, 15-16hrs.:* San Fernando, Granada, Edinburgh, Bidston, Stonyhurst, Shide, Paris, Moncalieri, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.
- November 2, 4hrs.:* Edinburgh, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.
- November 3, 5hrs.:* Shide, Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.
- November 3, 20hrs.:* Edinburgh, Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.
- November 4, 2hrs.:* Eskdalemuir, Edinburgh, Shide, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Zi-ka-wei, Osaka.
- November 4, 4hrs.:* San Fernando, Granada, Kew, Barcelona, Bombay.
- November 4, 14hrs.:* San Fernando, Granada, Edinburgh, Shide, Barcelona, Paris, Padova, Makeyevka, Ekaterinburg.
- November 6, 9-10hrs.:* Ekaterinburg, Irkutsk, Batavia, Manila, Sydney, Honolulu, La Paz.

1915. November 1.

Origin : 38°N. 144°0E., determined by Shade.

Time at Origin : 7h. 23m. 43s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.		O—C.		PR <sub>1</sub>		S.		O—C.		L.		M.		Remarks.		
				H.	M.	S.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.				
Osaka	O.	77	257	7	25	40	0	7	28	10	7	31	48	7	27	30	7	28	0	38°58. 142°0E.
Zi-ka-wei	W.	198	256	7	28	14	-8	7	24	46	7	31	15	7	32	36	7	35	24	—
	G.	310	311	7	28	11	-11	7	24	46	7	31	15	7	33	13	7	36	21	—
Irkutsk	W.	311	227	7	30	12	-10	7	24	46	7	36	8	7	42	10	7	46	6	—
Honolulu	M.	522	93	7	33	36	+32	7	36	30	7	40	48	7	40	36	7	57	48	—
Simla	O.E.	543	284	7	33	12	-6	7	40	48	7	41	11	7	52	24	7	57	48	38°78. 142°3E.
Ekaterinburg	G.	556	319	7	33	34	+8	7	41	11	7	41	11	7	52	24	7	57	48	—
Batavia	W.	561	226	7	33	37	+7	7	41	11	7	41	11	7	52	24	7	57	48	—
Bombay	M.	640	275	7	34	32	+11	7	42	42	7	42	42	7	52	24	7	57	48	—
Victoria	M.	642	47	7	34	0	-22	7	42	42	7	42	42	7	52	24	7	57	48	—
Kodakanal	M.	654	263	7	35	6	+36	7	42	42	7	42	42	7	52	24	7	57	48	—
Colombo	M.	656	239	7	34	30	-2	7	37	15	7	43	39	7	53	0	7	57	48	—
Pulkovo	M.	682	330	7	34	45	-3	7	37	15	7	43	39	7	53	0	7	57	48	37°08. 140°0E.
Berkeley	G.	702	57	7	35	27	+26	7	44	25	7	44	25	7	54	8	7	57	48	—
	N.	702	57	7	35	28	+27	7	44	25	7	44	25	7	54	8	7	57	48	—
Lick	W.	712	58	7	35	31	+24	7	41	10	7	45	16	7	54	41	7	57	48	—
Tiflis	G.	716	309	7	35	6	-4	7	41	10	7	45	16	7	54	41	7	57	48	24°48. 156°3E.
Makeyevka	M.	718	317	7	35	10	-2	7	38	8	7	44	30	7	54	0	7	57	48	30°58. 146°3E.
Sydney	G.	722	174	7	44	30	+28	7	38	8	7	44	30	7	54	0	7	57	48	S.R. 7h. 56m. 30s.
Riverview	W.	747	205	7	35	36	+22	7	45	0	7	44	42	7	54	0	7	57	48	P.S. 7h. 45m. 10s.
Perth	M.	806	342	7	36	30	-540	7	45	0	7	45	0	7	54	0	7	57	48	—
Dyce, Aberdeen	N.	806	342	7	36	5	-1	7	45	0	7	45	0	7	54	0	7	57	48	—
Edinburgh	M.	820	342	7	36	7	+1	7	45	0	7	45	0	7	54	0	7	57	48	—
Esdalesmuir	M.	820	342	7	36	0	-13	7	45	0	7	45	0	7	54	0	7	57	48	—
Stonyhurst	M.	826	342	7	36	12	-5	7	39	30	7	46	22	7	54	0	7	57	48	149°0E. 41°0N.
Bidston	M.	837	341	7	36	42	-161	7	46	22	7	46	22	7	54	0	7	57	48	—
West Bromwich	M.	843	341	7	36	0	-27	7	46	22	7	46	22	7	54	0	7	57	48	—
	M.	843	340	7	36	20	-10	7	46	22	7	46	22	7	54	0	7	57	48	—
Kew	M.	853	339	7	36	42	+9	7	46	22	7	46	22	7	54	0	7	57	48	—



Haslemere	E.	M.	85.7	339	7	46	50	7	8.	7	46	50	-20	7	8	10	0	8	15	10
Padova	(E.	V.	86.1	31	7	36	19	-18		7	46	52	-22	7	8	18	29	8	15	29
Shide	(E.	M.	86.2	339	7	36	43	+6		7	47	33	+18	7	8	20	0	8	20	0
	(E.	M.	86.2	339	7	36	33	-4		7	46	38	...	7	8	22	30	8	15	30
Paris		M.	86.7	336	7	36	28	-9		7	46	38	-17	7	8	13	0	8	13	0
Helwan	E.	M.	87.5	307	7	35	48	-57		7	46	57	-24	7	8	29	0	8	29	0
Moncalieri		S.	88.9	331	7	36	39	-10		7	46	12	-78	7	8	20	32	8	20	32
Rocca di Papa		Agg.	88.7	326	7	36	56	+4		7	47	19	-18	7	8	11	38	8	20	36
Ottawa		B.	89.2	27	7	37	33	+9		7	47	10	-33	7	8	7	36	8	27	0
Toronto	E.	M.	89.3	30	7	47	48	7.8.		7	47	30	-18	7	8	24	12	8	24	12
Malta		M.	92.6	321	7	39	0	+107		7	47	48	1	7	8	24	12	8	24	12
Barcelona	E.	M.	93.3	332	7	37	13	...		7	48	6	...	7	8	22	30	8	22	30
Harvard Univ.	E.	M.	93.5	25	7	37	45	-5		7	47	32	-42	7	8	22	30	8	22	30
Granada	S.	C.	99.1	334	7	45	50	-4		7	49	27	-5	7	8	19	30	8	19	30
Rio Tinto	E.	M.	99.5	337	7	45	50	7.8.		7	45	30	-214	7	8	33	0	8	33	0
San Fernando	(E.	M.	100.6	336	7	42	0	+214		7	49	30	-14	7	8	20	30	8	27	0
	(S.	M.	100.6	336	7	38	0	+4		7	48	30	74	7	8	18	30	8	28	30
Azores		M.	103.8	352	7	50	0	7.8.		7	50	0	-11	7	8	15	30	8	15	30
Cape Town	E.	M.	136.4	259	7	43	12	+153		8	39	12	+2687	8	3	12		9	3	12
La Paz			144.5	62	7	43	42	+150		7	59	15	+243	8	25	8		8	34	55

S.R. 7h. 53m. 35s.

38° 78. 113. 54.

1915. November 4.

Origin :  $37^{\circ}0'N$ .  $144^{\circ}5'E$ ., determined by Slide.

Time at Origin : 3h. 11m. 44s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.	O-C.	PR <sub>1</sub>	S.	O-C.	L.	M.	Remarks.
				H. M. S.	S.	H. M. S.	H. M. S.	S.	H. M. S.	H. M. S.	
Osaka	O.	7.7	256	3 13 49	+ 8	—	—	...	3 15 42	3 16 30	860 kms.
Zi-ka-wei	W.	19.9	260	3 16 24	0	—	3 20 0	...	3 21 8	3 23 41	—
Irkutsk	G.	19.9	260	3 16 24	0	—	3 17 4	...	3 21 44	3 23 25	—
Honolulu	G.	31.9	312	3 12 7	-383	—	3 29 6	+50	3 22 0	3 24 52	40°-6N. 143°-0E.
Simla	M.	51.1	91	3 29 6	? S.	—	3 29 6	...	—	3 30 0	—
Ekaterinburg	O.E.	54.9	285	—	...	—	—	...	—	3 43 0	—
Pulkovo	G.	56.6	321	3 21 37	+ 3	—	3 29 19	...	3 38 0	3 47 46	—
Tiflis	G.	68.3	330	3 22 50	+ 0	3 25 19	3 31 47	...	3 44 0	3 51 11	37°-9N. 143°-3E.
Maikop	G.	72.8	318	3 23 14	- 3	—	3 32 30	-10	3 50 0	3 56 42	35°-6N. 141°-2E.
Edinburgh	G.	83.1	342	3 23 15	- 4	3 25 49	3 32 29	-15	3 41 0	3 52 48	42°-0N. 148°-0E.
Stonyhurst	M.	84.8	341	3 34 0	? S.	—	3 34 0	-42	—	4 4 0	—
Bidston	M.	85.3	341	3 31 42	? S.	—	3 31 42	-199	—	4 1 0	—
Kew	M.S.	86.3	341	3 31 48	+434	—	3 36 12	+66	—	4 2 30	—
Shide	M.	87.2	339	—	...	—	—	...	—	4 7 0	—
Paris	M.	87.2	339	—	...	—	3 35 8	-19	—	4 13 13	—
Hielwan	M.	88.4	336	—	...	—	3 35 3	-24	—	4 16 33	—
Moncalieri	S.	89.2	331	—	...	—	3 35 10	-17	—	4 2 0	—
Barcelona	M.	94.3	333	—	...	—	3 32 8	-19	—	4 2 0	—
Granada	C.	100.1	335	—	...	—	3 35 5	-29	4 0 0	4 1 0	—
San Fernando	M.	101.6	336	—	...	—	3 35 48	+ 8	—	4 7 0	e 3h. 57m. 39s.
La Paz	M.	101.6	336	—	...	—	—	...	4 0 23	—	—
	N.	144.7	64	3 31 46	+152	—	—	...	4 4 54	—	—
	—	—	—	—	—	—	—	...	4 6 0	—	—
	—	—	—	—	—	—	—	...	4 9 30	4 10 30	—
	—	—	—	—	—	—	—	...	4 15 30	4 17 0	—

**Small Earthquakes which do not give good determinations—**

- November 7, 7-8hrs.:* Edinburgh, Bidston, Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Sydney, Riverview, Honolulu.  
*November 11, 18-19hrs.:* Bidston, Rocca di Papa, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Osaka.  
*November 11, 23hrs.:* Padova, Irkutsk, Osaka, Sydney, La Paz.  
*November 13, 10-11hrs.:* Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Batavia, Manila, Zi-ka-wei, Honolulu.  
*November 13, 14hrs.:* Shide, Tiflis, Ekaterinburg, Irkutsk, Zi-ka-wei, Osaka.  
*November 16, 1-2hrs.:* San Fernando, Edinburgh, Bidston, Stonyhurst, Shide, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Osaka, La Paz.  
*November 18, 1hr.:* Edinburgh, Pulkovo, Makeyevka, Ekaterinburg, Manila, La Paz.  
*November 20, 11-15hrs.:* Ascension, San Fernando, Eskdalemuir, Edinburgh, Bidston, Shide, Pulkovo, Helwan, Makeyevka, Ekaterinburg, Bombay, Kodakamal, Sydney, Riverview, Berkeley.  
*November 20, 22hrs.:* Ascension, Eskdalemuir, Edinburgh, Stonyhurst, Shide, Kew, Acre, Paris, Moncalieri, Rocca di Papa, Pompeii, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, La Paz.  
*November 26, 19hrs.:* Ascension, Eskdalemuir, Edinburgh, Bidston, Shide, Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Ottawa, Harvard University, La Paz.  
*November 26, 20hrs.:* Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Simla, Irkutsk.  
*November 29, 22hrs.:* San Fernando, Edinburgh, Bidston, Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Sydney, Riverview.  
*November 30, 1-5hrs.:* Edinburgh, Stonyhurst, Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Honolulu, Ottawa, La Paz.  
*November 30, 17-18hrs.:* Bidston, Shide, Pulkovo, Makeyevka, Ekaterinburg, Bombay, Irkutsk, Batavia.  
*November 30, 20hrs.:* Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Bombay, Simla, Irkutsk, La Paz.  
*December 1, 16hrs.:* Azores, Edinburgh, Shide, Rocca di Papa, Pulkovo, Makeyevka, Ekaterinburg.  
*December 5, 11-12hrs.:* Ekaterinburg, Irkutsk, Batavia, Zi-ka-wei, Osaka.  
*December 7, 12-13hrs.:* Ascension, San Fernando, Edinburgh, Shide, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Simla, Irkutsk.  
*December 9, 13-14hrs.:* San Fernando, Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Sydney, Riverview, Honolulu, La Paz.

1915. November 18.

Origin : 37°0N. 143°0E., determined by Shide.

Time at Origin : 4h. 2m. 19s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.		O-C.		PR <sub>1</sub>		S.		O-C.		L.		M.		Remarks.
				H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	
Osaka	O.	6.5	254	4 4 9	+11	—	—	—	—	—	—	—	—	4 6 2	7 16	—	—	860 kmps.
Zi-ta-wei	{ O.	18.7	259	4 6 47	+3	—	—	—	—	4 10 13	—	—	—	4 11 55	4 13 35	—	—	S.R. 4h. 11m. 1s.
Manila	{ W.	18.7	259	4 6 44	+0	—	—	—	—	4 10 23	—	—	—	4 15 46	4 15 46	—	—	—
Honolulu	W.	29.8	227	4 8 47	+2	—	—	—	—	4 13 46	—	—	—	4 16 9	4 19 17	—	—	—
Simla	M.	53.0	88	4 11 42	-3	—	—	—	—	—	—	—	—	4 19 42	4 20 36	—	—	—
Batavia	O.E.	55.8	284	—	—	—	—	—	—	—	—	—	—	4 32 30	4 36 18	—	—	i 4h. 18m. 42s.
Ekaterinburg	W.	54.8	236	4 12 4	—	—	—	—	—	4 19 48	—	—	—	—	4 22 0	—	—	—
Bombay	G.	55.8	319	4 11 55	-9	—	—	—	—	4 19 35	—	—	—	—	4 34 59	—	—	—
Kodakanal	M.	63.2	274	4 19 52	? S.	—	—	—	—	4 19 52	—	—	—	—	4 45 40	—	—	—
Pulkovo	M.	64.4	263	4 21 30	? S.	—	—	—	—	4 21 30	—	—	—	4 41 18	4 45 54	—	—	—
Berkeley	G.	68.7	330	4 13 22	-6	—	—	4 15 49	—	4 22 18	—	—	—	4 37 0	4 41 45	—	—	40°2N. 149°1E. e 4h. 32m. 28s.
Makeyevka	—	71.5	36	—	—	—	—	—	—	—	—	—	—	4 40 0	—	—	—	—
Edinburgh	G.	72.0	317	4 25 0	—	—	—	—	—	4 25 0	—	—	—	—	4 43 53	—	—	—
Ekdalemuir	M.	82.7	342	—	? S.	—	—	—	—	4 25 6	—	—	—	—	4 53 30	—	—	—
Stonyhurst	G.	83.3	341	—	—	—	—	—	—	—	—	—	—	—	4 48 0	—	—	—
Bidston	E. M.S.	84.4	340	4 14 30	-35	—	—	—	—	4 25 54	—	—	—	—	4 57 0	—	—	—
Kew	N.	84.9	340	4 16 48	+102	—	—	—	—	4 24 30	—	—	—	—	4 54 6	—	—	—
Padova	E. M.	85.9	338	4 24 30	? S.	—	—	—	—	4 24 30	—	—	—	—	4 52 54	—	—	—
Hastanere	E.	86.4	338	4 49 50	? L.	—	—	—	—	—	—	—	—	4 49 50	4 52 48	—	—	—
Shide	V.	86.6	328	4 15 7	-9	—	—	—	—	—	—	—	—	—	4 58 20	—	—	—
Paris	{ E. M.S.	86.8	338	—	—	—	—	—	—	4 25 19	—	—	—	—	4 52 30	—	—	—
Helwan	{ E. M.B.	86.8	338	—	—	—	—	—	—	4 25 37	—	—	—	—	4 52 30	—	—	—
Moncalieri	{ E.	87.3	335	—	—	—	—	—	—	4 25 35	—	—	—	—	4 52 30	—	—	—
Rocca di Papa	M.	87.5	306	4 15 14	-6	—	—	—	—	4 25 34	—	—	—	—	4 57 0	—	—	—
Ottawa	S.	88.6	330	4 25 34	? S.	—	—	—	—	4 25 34	—	—	—	—	—	—	—	S. 4h. 34m. 56s.
Barcelona	Aga.	89.0	325	4 25 34	-1	—	—	—	—	? 4 25 36	—	—	—	—	4 59 15	—	—	—
	B.	90.5	26	? 4 15 30	—	—	—	—	—	4 26 6	—	—	—	—	4 59 24	—	—	—
	Mn.	93.8	332	—	—	—	—	—	—	—	—	—	—	—	4 58 40	—	—	—



Granada	C.	99.7	334	—	4 33 0	...	?	3.	—	4 33 0	...	7.4	48	0	4 38 0	e 4h. 36m. 0s.
Rio Tinto	E.	100.1	336	—	4 31 30	...	?	3.	—	4 31 30	+284	2.5	6	0	4 41 0	—
San Fernando	M.	101.2	335	—	4 27 0	...	?	3.	—	4 27 0	+184	2.5	6	0	5 7 0	—
Ia Paz	M.	101.2	335	—	4 27 0	...	?	3.	—	4 27 0	86	2.5	6	0	5 7 0	—
		145.7	62	—	4 22 4	...	?	3.	—	4 22 4	...	2.5	13	10	5 36 10	—



**Small Earthquakes which do not give good determinations—**

- December 12, 17hrs.:* Ekaterinburg, Irkutsk, Manila, Osaka.  
*December 12, 21hrs.:* Pulkovo, Helwan, Makeyevka, Ekaterinburg, Irkutsk, Berkeley, Lick, Ottawa, Harvard University, La Paz.
- December 16, 13-14hrs.:* Ascension, Malta, Pulkovo, Ekaterinburg, Irkutsk, Riverview, La Paz.  
*December 17, 11-12hrs.:* Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Manila, La Paz.  
*December 17, 19hrs.:* Edinburgh, Bidston, Stonyhurst, Kew, Paris, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Bombay, Irkutsk.
- December 18, 9-10hrs.:* Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk.  
*December 18, 18hrs.:* Ascension, San Fernando, Granada, Eskdalemuir, Edinburgh, Stonyhurst, Shide, Kew, Barcelona, Paris, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Kodakanal, Irkutsk, La Paz.
- December 18, 21-22hrs.:* San Fernando, Moncalieri, Pulkovo, Helwan, Makeyevka, Ekaterinburg, Irkutsk, La Paz.
- December 21, 9hrs.:* Irkutsk, Manila, Sydney, Riverview, Honolulu.  
*December 22, 11-12hrs.:* Helwan, Tiflis, Ekaterinburg, Irkutsk, Batavia, Riverview, Honolulu.
- December 22, 20hrs.:* Ascension, Helwan, Tiflis, Ekaterinburg, Irkutsk, La Paz.  
*December 26, 9hrs.:* San Fernando, Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Kew, Moncalieri, Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, La Paz.
- December 27, 3-Hrs.:* Shide, Pulkovo, Makeyevka, Ekaterinburg, Irkutsk, Zi-ka-wei, Adelaide, Sydney, Riverview, Honolulu, La Paz.
- December 27, 9hrs.:* Pulkovo, Makeyevka, Tiflis, Ekaterinburg, Simla, Zi-ka-wei.  
*December 28-29, 23-0hrs.:* Azores, San Fernando, Granada, Eskdalemuir, Edinburgh, Bidston, Stonyhurst, Shide, Kew, Barcelona, Paris, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Irkutsk, Batavia, Manila, Zi-ka-wei, Sydney, Riverview, Honolulu, Ottawa, Harvard University, La Paz.
- December 29, 22hrs.:* Irkutsk, Manila, Riverview, Honolulu, Berkeley.  
*December 30, 2hrs.:* Edinburgh, Shide, Pulkovo, Helwan, Makeyevka, Tiflis, Simla, Irkutsk.
- December 31, 23hrs.:* San Fernando, Granada, Edinburgh, Shide, Paris, Moncalieri, Rocca di Papa, Pulkovo, Helwan, Makeyevka, Tiflis, Ekaterinburg, Simla, Colombo, Irkutsk, Batavia, Perth, Manila, Zi-ka-wei, Riverview, Honolulu, Berkeley, Ottawa, Harvard University, La Paz.

1915. November 21.

Origin : 32°0N. 119°0W., determined by Shide.

Time at Origin : 0h. 13m. 32s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.		O-C.		PR <sub>1</sub>		S.		O-C.		L.		M.		Remarks.	
				H.	M.	S.	S.	H.	M.	S.	H.	M.	S.	H.	M.	S.			
Lick	W.	5.5	338	0	16	0	+63	—	—	—	—	...	...	1	18	0	1	18	Felt in California— Arizona line. Uncertain.
Santa Clara	{ N. E.	5.9 336	336	1	15	45	+42	—	—	—	—	...	...	1	18	0	1	19	
Berkeley	{ N. E.	6.4 336	336	0	15	45	+35	—	—	—	—	...	...	0	17	44	0	18	—
	{ V.	6.4 336	336	0	15	47	+37	—	—	—	—	...	...	0	17	49	0	18	
Ottawa	B.	35.8	55	0	15	47	+37	—	—	—	—	...	...	0	18	7	0	19	—
Honolulu	E.	36.3	263	0	20	34	-18	—	—	—	—	...	...	0	28	48	0	32	
Harvard Univ.	E.	39.0	61	0	21	6	+10	—	—	—	—	...	...	0	30	6	0	35	—
La Paz	B.O.	68.7	127	0	24	46	-32	—	—	—	—	...	...	0	29	54	0	33	
Azores	M.	73.4	156	0	24	31	-10	—	—	—	—	...	...	0	42	11	0	50	—
Dyce, Aberdeen	M.	76.1	30	—	53	18	+1688	—	—	—	—	...	...	0	56	42	0	56	
Edinburgh	M.	76.6	31	0	35	0	? 8.	—	—	—	—	...	...	0	54	0	0	57	—
Eskdalemuir	G.	76.9	32	0	35	0	...	—	—	—	—	...	...	0	52	30	0	58	
Bidston	M.S.	78.2	33	0	35	30	? 8.	—	—	—	—	...	...	—	—	—	0	55	—
Stonyhurst	E.	78.2	33	0	34	36	? 8.	—	—	—	—	...	...	—	—	—	0	54	
Shide	M.	80.8	35	0	35	52	-13	—	—	—	—	...	...	—	—	—	1	0	—
Haslemere	{ M. E.	80.8 35	35	0	25	12	-44	—	—	—	—	...	...	0	51	17	1	4	
	{ M. E.	80.8 34	34	0	26	16	+3	—	—	—	—	...	...	? 0	47	0	1	0	—
Kew	E.	80.8	34	0	37	0	? 8.	—	—	—	—	...	...	—	—	—	1	7	
Paris	E.	83.9	34	0	26	16	+3	—	—	—	—	...	...	0	49	0	0	55	—
Fulkovo.	G.	84.8	15	0	26	22	+3	0	29	21	—	...	...	0	52	0	1	6	
San Fernando	E.	87.0	48	0	26	22	+3	—	—	—	—	...	...	0	54	30	0	59	Destructive in Imperial Valley. c 0h. 49m. 33s.
Granada	C.	88.2	46	0	26	27	-11	—	—	—	—	...	...	0	47	18	0	55	
Barcelona	M.	88.7	40	—	—	—	...	—	—	—	—	...	...	0	52	9	1	1	—
Moncalieri	S.	89.1	35.	? 0	29	5	+142	—	—	—	—	...	...	0	49	46	1	2	
Ekaterinburg	G.	91.2	360	0	26	49	-5	—	—	—	—	...	...	0	50	0	1	10	—
Rocca di Papa	Ag.	93.8	34	—	—	—	...	—	—	—	—	...	...	1	5	42	—	—	



[illegible]





1915. December 6.

Origin : 41°5N. 146°0E., determined by Slide.

Time at Origin : 20h. 58m. 5s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O-C.			PB <sub>1</sub>			S.			O-C.			L.			M.			Remarks.	
				H.	M.	S.	S.	M.	S.	H.	M.	S.	H.	M.	S.	S.	M.	S.	H.	M.	S.	H.	M.	S.		
Osaka	O.	10.7	235	21	3	7	...	...	...	...	...	...	21	7	3	...	...	...	21	3	18	21	4	44	?	S. 21h. 1m. 4s.
Zi-ka-wei	W.	22.2	251	20	58	16	...	...	...	...	...	...	21	3	22	...	...	...	21	8	0	21	13	11	—	
Irkutsk	G.	30.0	306	21	15	18	?	8.	...	...	...	...	21	15	18	...	...	...	21	23	42	21	8	54	—	43°-48. 147°-51.
Honolulu	E.	50.9	96	21	7	31	4	...	...	...	...	...	21	15	2	...	...	...	21	23	0	21	27	18	—	
Ekaterinburg	G.	54.0	318	21	8	57	...	...	...	...	...	...	21	17	36	...	...	...	21	30	0	21	28	45	—	i 21h. 15m. 18s.
Sinla	O.E.	55.0	283	21	9	31	+	2	...	...	...	...	21	18	47	...	...	...	21	35	0	21	35	28	—	i 21h. 21m. 24s.
Pulkovo	G.	65.9	330	21	9	27	+	1	...	...	...	...	21	18	35	...	...	...	21	30	0	21	37	46	—	
Makeyevka	G.	70.3	317	21	9	27	+	1	...	...	...	...	21	18	35	...	...	...	21	30	0	21	41	38	—	25°-28. 88°-2E.
Tiflis	G.	70.6	309	21	45	0	to	2081	...	...	...	...	21	18	35	...	...	...	21	30	0	21	54	0	—	
Edinburgh	E.	79.2	343	21	30	0	to	22h. 15m. 0s.	...	...	...	...	21	19	0	...	...	...	21	46	0	21	46	0	—	
Eskdalemuir	G.	79.7	343	21	19	0	?	8.	...	...	...	...	21	19	0	...	...	...	21	48	0	21	48	0	—	
Stonyhurst	E.	80.9	342	21	19	0	?	8.	...	...	...	...	21	19	0	...	...	...	21	50	0	21	50	0	—	
Bidston	N.	81.4	342	21	43	0	+	1912	...	...	...	...	21	20	55	...	...	...	21	44	0	21	45	40	—	
Kew	E.	82.5	340	21	10	35	+	9	...	...	...	...	21	20	55	...	...	...	21	44	0	21	45	40	—	
Shide	E.	83.5	340	21	10	35	+	9	...	...	...	...	21	20	55	...	...	...	21	44	0	21	45	40	—	
Paris	M.B.	84.1	337	21	21	42	...	...	...	...	...	...	21	21	42	...	...	...	21	43	8	21	53	53	—	
Moncalieri	S.	85.8	332	21	21	42	?	8.	...	...	...	...	21	21	42	...	...	...	21	52	30	21	54	30	—	
Rocca di Papa	Agul.	86.6	337	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	49	15	...	...	...	—	
Harvard Univ.	B.O.	89.7	26	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	48	0	22	7	0	—	
Granada	C.	96.5	336	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	57	0	21	59	30	—	
San Fernando	M.	98.0	338	21	51	30	+	2365	...	...	...	...	21	51	30	...	...	...	21	57	0	21	59	30	—	
La Paz	{ E. N.	98.0 141.5	338 60	21	50	30	+	2305	...	...	...	...	21	50	30	...	...	...	21	55	0	21	57	30	—	
				21	18	0	+	158	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	—	



1915. December 7.

Origin : 9°0N. 44°5W., determined by Slide.

Time at Origin : 10h. 38m. 0s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.		O-C.		Pr.		S.		O-C.		L.		M.		Remarks.
				H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	H.	M.	
La Paz	—	31.6	223	10	15	11	31	10	47	9	39	10	30	10	58	0	10	—
Harvard Univ.	B.O.	40.7	330	10	16	20	19	10	47	9	37	10	30	10	57	8	10	—
San Fernando	M.	44.2	46	10	16	20	19	10	47	9	37	10	30	10	57	8	10	—
Rio Tinto	E.	44.6	44	10	19	0	150	10	49	0	0	10	30	10	59	0	11	—
Ottawa	E.	45.3	329	10	47	7	32	10	47	7	6	10	30	10	59	12	10	9°0S. 38°5W.
Granada	C.	46.4	46	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Barcelona	M.	52.3	44	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Slide	M.	51.8	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
	M.	51.8	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
	M.S.	51.8	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Bilston	E.	54.8	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Kew	E.	55.5	29	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Paris	M.	55.7	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Stonyhurst	E.	55.8	36	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Eschdenham	E.	56.0	29	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Edinburgh	E.	56.5	27	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Moncalieri	E.	56.9	26	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Rocca di Papa	M.	57.4	42	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Pulkovo	S.	59.8	46	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Malayaevka	Agn.	74.6	30	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Tiflis	G.	78.5	43	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Ekaterinburg	G.	83.5	49	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Mauritius	G.	90.6	32	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
	G.	101.5	109	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Mauritius	—	104.5	109	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Irkutsk	E.	104.5	109	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Sydney	G.	113.1	208	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Riverview	G.	131.2	208	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
Batavia	W.	151.3	86	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—
	W.	151.4	86	10	46	19	24	10	46	19	24	10	30	10	54	12	10	—

1915. December 17.

Origin : 42° 0N. 79° 5E., determined by Slide.

Time at Origin : 7h. 4m. 47s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O—C.			PR <sub>1</sub>			S.			O—C.			L.			M.			Remarks.
				U.	M.	S.	S.	U.	M.	S.	U.	M.	S.	U.	M.	S.	U.	M.	S.	U.	M.	S.	U.	M.	
Simla	O.E.	11.0	190	7	7	36	+ 5	—	—	7	9	30	— 11	7	11	0	7	12	0	—	—	—	—	—	
Ektarinburg	G.	19.1	327	7	9	26	+ 9	—	—	7	13	3	+ 12	7	15	0	7	19	0	—	—	—	—	—	
Irkutsk	G.	19.6	50	7	3	35	— 318	—	—	7	7	10	— 352	7	9	30	7	11	10	—	—	—	—	43° 6N. 77° 7E.	
Bombay	E.	23.8	196	7	14	40	? S.	—	—	7	14	40	+ 13	7	20	0	7	20	10	—	—	—	—	—	
Makeyevka	G.	29.6	296	7	11	9	— 2	—	—	7	16	12	— 2	7	20	0	7	22	17	—	—	—	—	—	
Kodukanal	M.	31.9	184	7	16	36	? S.	—	—	7	16	36	— 17	7	22	0	7	25	54	—	—	—	—	46° 7N. 82° 1E.	
Pulkovo	G.	34.7	318	7	11	52	— 6	—	—	7	17	22	— 16	7	21	0	7	26	39	—	—	—	—	—	
Zi-ka-wei	W.	34.9	93	7	11	54	— 5	—	—	7	17	28	— 13	7	21	0	7	29	57	—	—	—	—	—	
Colombo	M.	35.1	181	7	19	48	—	—	—	7	19	48	+ 10	7	31	13	7	33	25	—	—	—	—	—	
Osaka	O.	43.7	80	7	13	21	+ 2	—	—	7	22	5	+ 124	7	31	13	7	37	46	—	—	—	—	—	
Manila	W.	44.9	115	7	13	36	— 2	—	—	7	20	41	— 5	7	35	2	7	36	32	—	—	—	—	—	
Pompei	O.A.	47.6	291	7	13	44	— 1	—	—	7	23	49	+ 158	7	31	38	7	38	0	—	—	—	—	—	
Rocca di Papa	Aga.	48.4	294	7	13	44	+ 1	—	—	7	21	42	+ 9	7	37	0	7	35	36	—	—	—	—	—	
Moncalieri	S.	50.4	299	7	14	15	+ 1	—	—	7	24	0	+ 139	7	31	0	7	37	30	—	—	—	—	—	
Paris	S.	52.2	306	7	14	15	— 11	—	—	7	21	46	+ 4	7	31	0	7	40	6	—	—	—	—	—	
Edinburgh	E.	52.6	316	7	14	15	— 11	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Kew	E.	52.8	310	7	24	0	? S.	—	—	7	24	0	—	7	39	0	7	39	20	—	—	—	—	—	
Esksdalemuir	G.	52.9	315	7	14	18	+ 6	—	—	7	21	46	—	7	31	0	7	40	6	—	—	—	—	—	
Stonyhurst	M.	53.0	313	7	15	30	+ 77	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Huslemere	E.	53.2	310	7	15	30	—	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Bidston	M.	53.5	313	7	15	18	+ 61	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Shide	M.S.	53.5	313	? 7	14	14	— 3	—	—	? 7	21	41	— 10	7	39	0	7	39	20	—	—	—	—	—	
Batavia	E.	53.6	309	7	14	14	— 3	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Barcelona	M.B.	53.6	309	7	14	14	— 3	—	—	7	22	12	+ 22	7	39	0	7	39	20	—	—	—	—	—	
Batavia	W.	54.2	146	—	—	—	—	—	—	—	—	—	—	7	39	0	7	39	20	—	—	—	—	—	
Barcelona	M.	55.6	297	—	—	—	—	—	—	—	—	—	—	7	39	0	7	39	20	—	—	—	—	—	
Granada	C.	61.6	296	7	15	28	+ 18	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
Rio Tinto	M.	63.3	298	7	19	0	+ 219	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
Azores	E.	75.3	308	7	45	18	+ 1720	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
Ottawa	B.	89.8	343	—	—	—	—	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
Harvard Univ.	B.O.	91.6	339	—	—	—	—	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
Honolulu	M.	97.4	53	7	44	0	+ 1517	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	
La Paz	—	142.4	303	7	21	47	+ 159	—	—	7	39	0	—	7	39	0	7	39	20	—	—	—	—	—	

1915. December 19.

Origin: 3°5N. 98°0E., determined by Shide.

Time at Origin : 20h. 13m. 18s.

Station and (Component).	Machine.	Distance from Origin.	° Azimuth.	P.	O—C.	PR <sub>1</sub>	S.	O—C.	L.	M.	Remarks.
				H. M. S.	S.	H. M. S.	H. M. S.	S.	H. M. S.	H. M. S.	
Batavia	W.	13.1	138	20 16 33	+ 1		? 20 17 38	- 86		20 23 0	—
Kodikanal	M.	21.5	296	20 21 18	? S.		20 21 18	- 55	20 24 48	20 27 12	—
Manila	W.	25.2	63	20 19 10	+ 12		20 22 33	- 52	20 25 30	20 33 25	—
Bombay	M.	29.1	304	20 22 11	+ 154					20 31 51	—
Sinla	O.E.	33.9	327	20 25 24	? S.					20 34 12	—
Zi-la-wei	W.	35.4	36	20 20 34	- 1		20 25 24	- 32	20 33 42	20 38 20	—
Irakut	G.	49.1	5	20 22 15	- 4		20 26 48	+ 29		20 43 17	—
Ekatemburg	W.	61.0	338	20 32 35	- 6	20 24 14	20 29 28	+ 3	20 44 0	20 51 50	P.S. 20h. 33m. 23s.
Riverview	G.	62.4	131	20 32 6	? S.		20 31 55	+ 1	20 39 0	20 50 54	—
Makeyevka	W.	67.8	321	20 32 16	? S.		20 32 6	- 5	20 46 30	20 57 8	—
Helwan	G.	68.1	301	20 33 0	? S.		20 33 10	- 8	20 51 0	20 57 18	—
Pulkovo	M.	73.9	331	20 25 8	- 4	20 28 7	20 34 48	- 6	20 49 0	21 1 18	S.R. 20h. 38m. 30s.
Reca de Papa	G.	84.2	312	20 22 9	- 332			- 22	21 1 31	21 11 29	—
Moncalieri	Agg.	87.8	315	20 36 46	? S.		20 36 46	...	21 12 0	21 22 0	—
Kew	M.	92.4	322	20 53 0	+ 1568			...		21 19 42	—
Edinburgh	M.	93.3	327	21 11 42	+ 2690			...		21 6 0	—
Stonyhurst	E.	93.3	324	20 37 46	? S.		20 37 46	- 23	20 59 0	21 18 0	—
Eskdalemuir	G.	93.5	326	20 37 46						21 18 0	—
Shide	M.	93.7	321		...		20 37 40	- 31		21 18 0	P. and S. in ats.
Bidston	E.	93.7	321		...			...		21 18 0	—
Honolulu	M.S.	93.8	324		...			...	21 7 36	21 13 42	—
Harvard Univ.	E.	101.8	68		...			...	21 7 36	21 14 12	—
La Paz	B.O.	133.1	11		...			...	21 23 0	21 38 0	—
	—	161.1	225	20 34 0	+ 131			...	21 50 0	21 38 0	—

1915. December 25.

Origin : 37°0N. 35°5E., determined by Slide.

Time at Origin : 6h. 6m. 1s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P.			O-C.			PR <sub>1</sub>			S.			O-C.			I.			M.			Remarks.
				H.	M.	S.		H.	M.	S.		H.	M.	S.		H.	M.	S.		H.	M.	S.			
Helwan	{ E. N.	7-9	207	6	12	0	? S.				6	12	0	+145											
Tiflis	M.	7-9	207	6	8	0	- 1																		
Makeyevka	G.	8-5	55	6	8	15	- 5				6	19	15	+564											
Rocca di Papa	Ag.	11-2	292	6	8	51	3				6	11	13	13		6	14	0		6	14	55	36-0N. 33-0E.		
Padova	V.	18-2	303	6	10	30	+10				6	17	16	+182											
Moncalieri	S.	19-5	300	6	10	47	+11				? 6	15	53	41		6	19	22		6	21	13			
Pulkovo	G.	22-3	300	? 6	11	54	+44				6	15	39	13		6	20	0		6	23	14			
Ekaterinburg	G.	23-0	353								6	16	7	14		6	19	30		6	23	55			
Slide	{ N. E.	25-9	32	6	11	41	- 7													6	24	30			
	M.S.	29-4	309																						
	M.B.	29-4	309																						
Edinburgh	{ E. E.	32-0	319	6	22	0	? S.				6	22	0	+231		6	30	0		6	30	0			
Irkutsk	G.	49-2	49	6	15	0	2				6	22	7	3		6	31	0		6	34	34			

1915. December 31.

Origin : 44°5N. 86°5E., determined by Shide.

Time at Origin : 18h. 50m. 40s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P. H. M. S.	O-C. S.	PR <sub>1</sub> H. M. S.	S. H. M. S.	O-C. S.	L. H. M. S.	M. H. M. S.	Remarks.
Irkutsk	G.	14.1	50	18 54 33	+26		18 57 36	+46	18 59 0	19 0 42	45°7N. 81°0E.
Sima	O.E.	15.2	212	18 55 30	+68		18 59 6	-3	18 59 48	19 0 18	43°5N. 84°2E.
Ekaterinburg	G.	20.3	316	18 55 24	-1				19 1 0		
Bombay	G.	28.0	209	19 5 0	...	to 19h. 9m. 0s.			20 3 0		
Tiflis	M.	30.2	279	18 56 57	-13		19 1 53	...	19 3 30	19 10 4	
Zi-ka-wei	G.	30.3	104	18 57 18	+7		19 8 2	+343	19 7 0		
Makeyevka	G.	33.1	293	18 57 32	-5		19 3 34	-22	19 6 0	19 10 13	ex 19h. 3m. 52s.
Pukovo	G.	36.4	315	18 57 54	-11						40°0N. 77°0E.
Helwan	G.	45.3	269	19 17 0	+1065						
Moncalieri	M.	45.3	269	19 20 0	+1245				19 55 38	19 59 10	ex 19h. 51m. 0s.
Edinburgh	S.	53.6	300	19 20 0	+1185					19 21 0	
Boston	M.	54.4	316	19 20 0	+1185		19 8 36	+28		19 23 18	
Shide	N.	55.5	314	19 8 36	? E.					19 23 0	
	N.	55.9	310				19 8 9	...			
	E.	55.9	310		...						



1915. December 31.

Origin : 38° 0' N. 127° 0' W., determined by Shide.

Time at Origin : 12h. 19m. 30s.

Station and Component.	Machine.	Distance from Origin.	Azimuth.	P. H. M. S.	O. C. S.	Pl <sub>1</sub> H. M. S.	S. H. M. S.	O. C. S.	L. H. M. S.	M. H. M. S.	Remarks.
Berkeley		3.7	91	12 21 3	+35				12 21 59	12 23 29	
Santa Clara	N.E.	4.0	97	12 21 15	+43				12 22 30	12 23 24	
Lack	W.	4.4	102	12 21 22	+44				12 22 19	12 54 50	
Honolulu	E.	31.5	247	12 27 54	+101				12 34 6	12 37 42	
Ottawa	E.	38.3	62	12 27 3	7	12 28 27	12 30 48	-42	12 34 6	12 40 42	
Georgetown	W.	38.6	73	12 27 9	4		12 32 50	22	12 38 0		
Harvard University	B.O.	42.1	66	12 27 38	4	12 28 57	12 34 0	6	12 41 13	12 45 3	
Edinburgh	E.	74.7	29	12 41 0	? S.	10 13h. 15m. 0s.	12 41 0	+8		13 0 24	
Eskdalemuir	M. C.	75.0	20	12 45 0	? S.						
Azores	M. S.	75.6	53	12 54 42	? L.				12 54 42	13 9 24	
Bidston	S.	76.5	31	12 41 6	? S.		12 41 6	7	? 12 51 42	13 2 36	
Stonyhurst	M.	76.5	30				12 40 42	31	13 1 24	13 1 24	
La Paz	A	77.5	123	12 31 10	-24		12 42 6	+41	12 55 0	13 14 24	
Kew	E.	77.5	123	12 32 14	+40					12 51 30	
Shide	{ E. M.S. { E. M.B.	79.1 79.3	31 27						12 57 0	13 5 37	
Irkutsk	G.	79.3	331	12 30 54	-51		12 41 42	-3	12 56 0	12 57 6	
Pulkovo	G.	80.6	12	12 31 55	+2	12 35 16	12 41 46	14	12 58 0	13 2 36	
Paris	G.	82.3	31	12 32 20	4				12 55 0	13 5 0	
Ekaterinburg	G.	84.7	356	12 32 32	+9		12 44 31	-15	12 55 0	13 4 45	
Zi-ka-wei	W.	85.9	301	12 32 32	9		12 44 27	+88	13 1 32	13 45 40	
Rio Tinto	M.	86.4	43	12 41 0	? S.		12 44 0	124	13 13 0	13 13 0	
San Fernando	E.	87.5	44	12 44 0	? S.		12 44 0	+43	13 5 30	13 9 0	
San Fernando	E.	87.5	44	12 43 30	? S.		12 43 30	+13	13 5 30	13 8 0	
Moncalieri	N.	87.5	30	? 12 27 11	-321				12 54 32	13 7 14	
Barcelona	N.	88.0	36	12 33 9	+32				13 2 38	13 9 30	
Granada	C.	88.4	42						12 53 0	13 4 24	
Rovera di Papa	Ag.	92.1	29						13 11 6		

S.R. 12h. 47m. 18s.

Makeyevka	10	12 23 18	- 622	12 43 59	- 15	13	2	0	13	12 48
Tiflis	6	—	—	—	—	13	9	0	13	20 33
RiverView	238	—	...	—	...	13	5	0	13	15 7
Simla	338	—	...	—	...	13	—	—	—	—
Helwan	20	12 47 0	2 S.	12 47 0	10	—	—	—	—	—
	20	12 46 0	2 S.	12 46 0	50	—	—	—	—	—

i 13h, 15m, 30s.

C.  
G.  
W.  
O.E.  
M.  
M.A.E.  
N.









QE  
531  
B68  
1915  
Sept./  
Dec.

British Association for the  
Advancement of Science. C  
Committee on Seismological  
Investigations  
Monthly bulletin

PLEASE DO NOT REMOVE  
CARDS OR SLIPS FROM THIS POCKET

---

UNIVERSITY OF TORONTO LIBRARY

---

**STORAGE**

